CONSERVATION

AN AMENDMENT
TO THE GENERAL PLAN

PREPARED BY:
DONALD H. DAIDLAW & ASSOCIATES
SANTA ROSA, CALIFORNIA - 1973

SEBASTOPOL CONSERVATION ELEMENT

An Amendment to the General Plan

December, 1973

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ACKNOWLEDGMENTS

In preparing this report, the researchers have had to rely heavily on other published reports relating to resource conservation or allocation, and on input from knowledgable governmental officials and citizens whose information and opinions have been influential and most helpful in leading us to our conclusions.

We recognize that those who have assisted us may take issue with some of our conclusions or that they might feel that their information has been inaccurately interpreted. Because of the limited scope of this study, we have had to substitute our professional experience and judgement in those instances where conclusive data were not available. We regret that we have lacked the resources to totally corroborate all findings and conclusions contained herein. We accept the sole responsibility for all conclusions and recommendations, and if new facts should come to light, we stand ready to review our conclusions in light of new data.

At the end of the report are listed the sources upon whom we have relied, and we wish to express our appreciation to all of those who have contributed their thoughts, time, and energy. Most special thanks are given to: Melvin K. Davis, Sebastopol City Manager; Paul Schoch, Sebastopol City Engineer; Peter Rubtzoff, Botonist, San Francisco Academy of Science; Allan Buckmann, Area Representative, California Department of Fish and Game; David Snetsinger, North Coast Regional Water Quality Control Board; Gordon Bolander, property owner and nature enthusiast; and a very enlightened and cooperative Citizens' Conservation Committee. A grateful "thank you" is also expressed to all others who responded so generously.

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SUMMARY OF MAJOR RECOMMENDATIONS
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1. Re-examine resource allocations in the Laguna de Santa Rosa, which is a unique wildlife habitat. Prepare a water and game management plan, with participation by affected agencies, to stabilize and expand wildlife habitat, restrict illegal hunting, upgrade the Russian River fishery, reduce public maintenance costs, provide water to agriculture and improve scenic and open space quality. (Dept. of Fish & Game)

2. Establish AE-B5 (40 acre minimum) agricultural zoning in apple producing areas surrounding Sebastopol to protect the agricultural economy, resist intrusion by semi-rural subdivisions, and protect water recharge areas. (Sonoma County)

3. Protect against erosion and conserve urban vegetation through adoption of appropriate review procedures and controls. (City of Sebastopol)

INTRODUCTION

"When we try to pick up anything by itself, we find it attached to everything in the universe." John Muir

Conservation is the planned management of natural resources to prevent their exploitation, destruction, or neglect in order to enhance the relationship between people and their surroundings and to guarantee the viability of the natural and human ecosystems.

The State of California Government Code Title 7, Section 65302(d), as amended by Chapter 1803, Statutes of 1971, mandates inclusion of a Conservation Element in city and county General Plans, pursuant to guidelines for general plan elements prepared by the Council on Intergovernmental Relations as authorized by Section 34211.1 of the Government Code.

The purpose of this study and report is to comply with the above cited sections of the Government Code but, more importantly, to stimulate education, appreciation, and action by the citizens of Sebastopol in response to identified conservation needs. America today recognizes that resources are finite and that they must be protected for the economic, recreational, and cultural benefit of future generations.

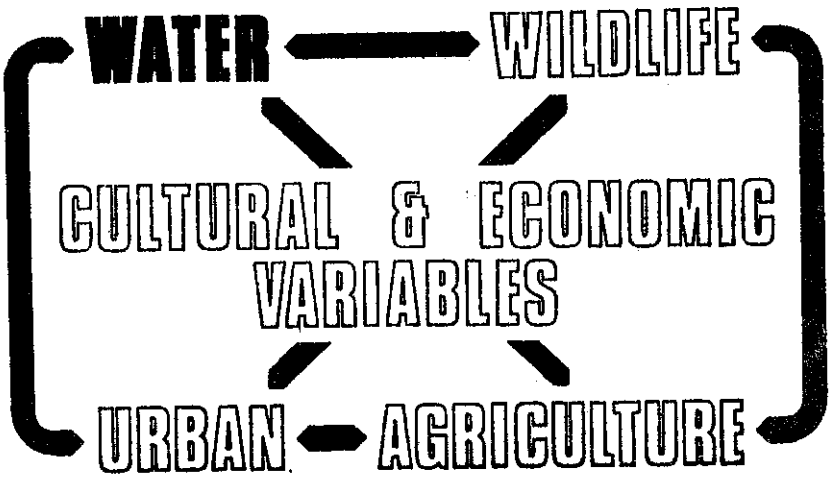
The geographical area of this study is limited to the sewer service area of the City of Sebastopol, which is topographically limited to a single drainage of approximately 1250 acres, plus areas of primary concern, such as those required for waste water disposal and for the protection of wildlife, agriculture, water quality, and scenic values, which directly affect Sebastopol residents. Topics covered include water resources, vegetative resources, wildlife, soils, and cultural resources:

discussion of bays, estuaries, and mineral resources are not appropriate to this report. General goals and policies expressed are consistent with those of the City of Sebastopol, Sonoma County, and other agencies regulating resource preservation or allocation, and all jurisdictions concerned have provided a coordinated input to the findings and conclusions contained herein.

The four principal finite resources discussed at length are: Water, Agriculture, Wildlife, and Urban Resources (including buildable land and scenic/cultural resources). These are all interrelated. How one resource is managed is a determinant of how other resources are affected, so management becomes the critical factor in implementing a conservation program and maintaining a long-term resource productivity.

Resources must be managed as a system and not haphazardly as independent entities. There are some very obvious - and some very obscure - cause and effect relationships between resources and resource utilization or management programs. Under stable conditions, water supports vegetation which in turn provides cover for wildlife (or provides crops which may be harvested to meet man's food requirements). Take away the water - or neglectfully overcultivate - and conditions change, and you have erosion, no food, and no habitat. Actual causal relationships are amplified in the body of this report. The degree to which causal relationships will exist are considered as variables, all of which are controlable through alternative management practices subject to cost, available technology, and the will of the people.

In the course of identifying and explaining causal relationships and management variables, there will be some redundancy, but this is unavoidable if the message of this report is to be understood, and if a "pathway" is to be defined for citizens, decision makers, and management to follow.



WATER RESOURCES

The importance of protecting municipal water resources hardly needs elaboration; water is basic to our existence. However, water more recently has been recognized as a finite resource with multiple use possibilities, so conservation measures are appropriate, both to assure future supply and to provide new economic and environmental benefits.

Water is consumed by residential, commercial, and industrial users and is the principal means for disposal of human and industrial wastes. It is necessary for agricultural production and for support of wildlife habitat and has high social value both aesthetically and for recreational uses.

Water supply is subject to diminution unless ground water recharge areas or other water sources are protected against pollution and overexploitation.

The following subsections relate water to its value in support of urban population, agriculture and wildlife, and to the cultural and economic benefits it provides.

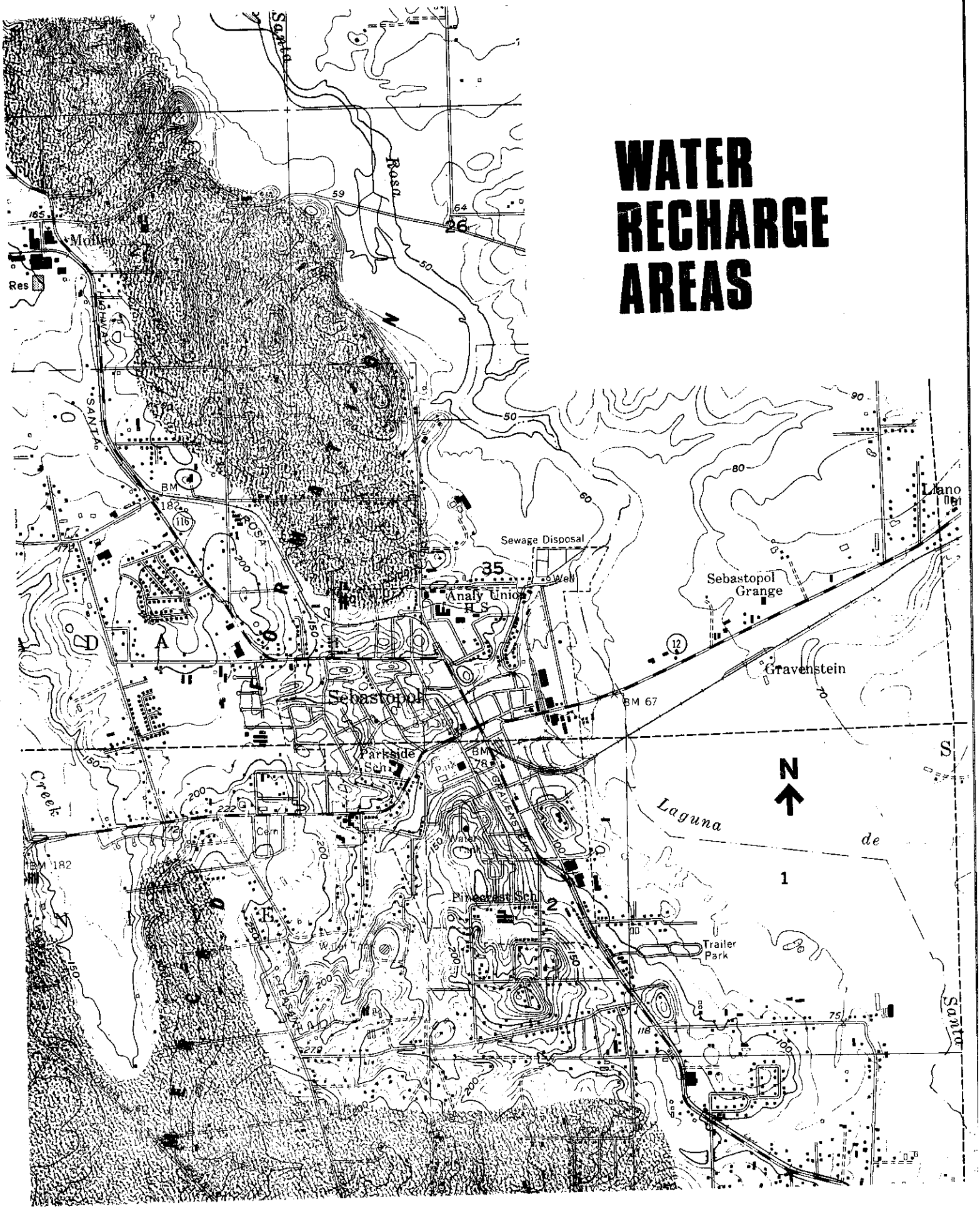
Relationship to Urban Resources

Summary - Sebastopol's municipal and industrial water supplies are drawn from deep wells penetrating the Merced geological formation, which is probably the best source of ground water in Sonoma County. There is very little contamination at the water table, and the water is not highly mineralized. Some private wells are high in mineral content or may be subject to contamination because of poor sealing or septic infiltration.

Sebastopol's municipal waste disposal system involves secondary treatment of waste water and disposal of same into the Laguna de Santa Rosa. During wet months, this poses no problem because possible contaminants are diluted; during the summer, when the flow in the Laguna is low, there has been indication of surface water contamination. The City of Sebastopol is actively seeking to upgrade its facilities to meet Water Quality Control Board standards, so that eventually there will be no further discharge into the Laguna during dry months; the treated effluent will be spray irrigated for the production of further treatment and dairy fodder. Private septic systems in portions of the City's projected sewer service area are failing with resultant public health problems. Sewers could be extended to serve these - and other - properties. Industrial waste disposal facilities (spray irrigation) are subject to upgrading to meet water quality standards.

Discussion - The City water system should be capable of providing high quality water in sufficient quantities to meet Sebastopol's needs, at least until 1985. At that time, the City will consider possible augmentation from the Sonoma County Aqueduct, which will bring water from the Warm Springs

WATER RECHARGE AREAS



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Dam. However, the highest peak period flow measured from City wells has been less than 60% of present capacity, and the Merced formation aquifer should be capable of producing sustained supply if additional wells are drilled, provided the water recharge area around the City of Sebastopol is adequately protected. The Sebastopol area is at the interface between the Merced and Glen Ellen geological, where the Glen Ellen formation functions as a pipeline to bring additional water to the Merced formation, which in turn functions as a storage tank for vast quantities of underground water. Past measurements have shown that even with current demands placed on the aquifer, the water table has not declined and probably would not decline with additional pumping.

Many private wells are shallow, and the water has a high mineral content of iron, manganese, and sulphur dioxide. The County Health Department is concerned that some of these wells may also be contaminated because of poor sealing and septic pollution of local ground water tables, which can create whole impacted areas, although quantitative data are not available on the number of well failures. Extension of City water and sewer services should substantially reduce this problem.

The City has considered initiating a program of water and sewer extensions to unserved areas pursuant to a plan first proposed four years ago, but not implemented. This could still be done as part of the City's overall proposed upgrading of water and sewer lines, contingent upon funds being available to pay initial costs, which in turn would be subject to reimbursement by property owners receiving water and sewer services.

Under order dated October 25, 1972, the North Coast Regional Water Quality Control Board set forth waste discharge requirements to be met by the City of Sebastopol in the treatment and

disposal of municipal sewer wastes. Many technical requirements were set forth to prevent contamination of surface waters in the Laguna de Santa Rosa and the Russian River, and performance deadlines were established. The City was cited in 1973 for not having met basic pollution control standards and has until May 15, 1974, to take further steps to reduce toxicity of treated effluent to prevent deleterious effects on aquatic biota, wildlife, and water fowl. Also, on or before that date, the City is required to eliminate discharge to the Laguna during the period of May 15 through September 30 or other times when the flow of the Russian River is less than 1000 cubic feet per second at Healdsburg.

Rulings by the Water Quality Control Board present a very difficult problem for the City of Sebastopol to overcome. Even with unlimited financial resources, design and construction time schedules indicate at least a thirty month period before all water quality standards could be met. Alternatives must be considered, costs and benefits analyzed, and political policy decisions made as to how to proceed.

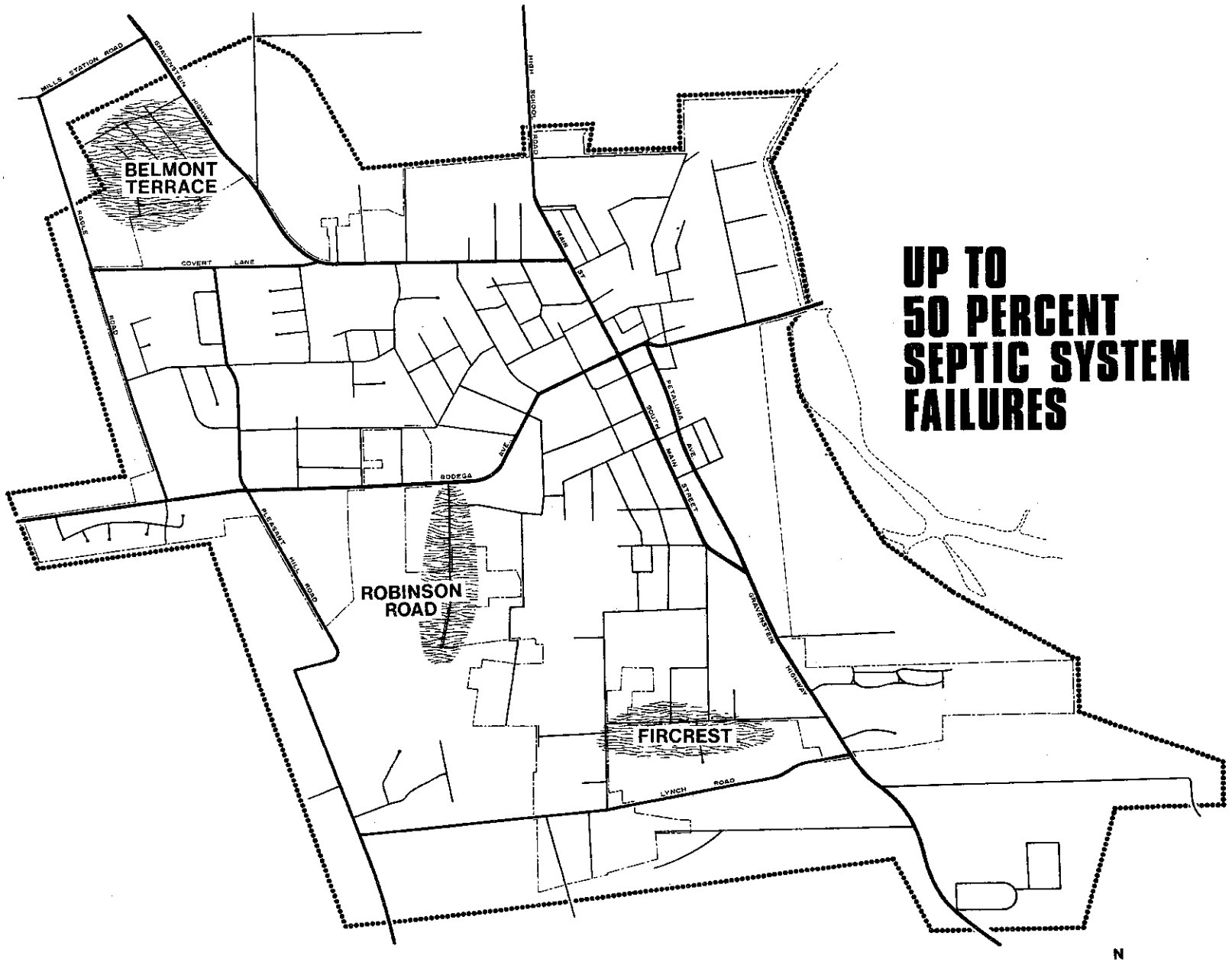
There are two alternatives: (1) construct a new sewage treatment plant with capacity of 0.7 million gallons per day on a site with sufficient land area to allow for effluent disposal by spray irrigation and ultimate capacity to process up to 1.65 million gallons per day to serve a projected future population in excess of 15,000; or (2) connect to the proposed Laguna Treatment Plant of the City of Santa Rosa, with allowance for up to 700,000 gallons per day to be treated initially, subject to an understanding that additional capacity would be provided by Santa Rosa after 1985 when higher daily discharge is projected.

The City of Sebastopol has extensive experience in managing a spray irrigation program adjacent to the Laguna, which is helpful because of characteristics of the Wright Clay Loam

soils in the area; they are susceptible to saturation and ponding.

The Sonoma County Health Department has identified areas of failing private septic systems. Field surveys have indicated up to 50% failures plus numerous marginal septic systems in the Belmont Terrace subdivision and in areas along Robinson Road and Fircrest, as shown on the attached map. Inadequate percolation of soils or insufficient site area mitigate against expansion of these septic systems to remedy the problem; therefore, there is a continuing public health concern over contamination of private wells and surface discharge of pollutants. Extension of sewer services to these areas is feasible, provided the property owners are willing to pay their share of the cost. A program combining the efforts of the County Health Department and the City to encourage formation of voluntary sewer assessment districts would be one way to accomplish this; otherwise, sewer service would either have to wait until intervening areas were developed, and sewers thus brought to the property, or the City would have to use its own resources to extend the sewers, with the risk that many years might pass before full reimbursement were received.

The apple canning industry presently uses substantial quantities of water for apple processing and requires treatment of waste water in excess of 500,000 gallons per day during peak periods in the summer. This has resulted in existing treatment facilities having to operate over capacity and in some overflow discharge of waste water to the Laguna. Under a cease and desist order issued by the Water Quality Control Board, the City of Sebastopol, which contracts with the canneries to provide waste water disposal services, must complete an engineering report as a basis for developing facilities which will reliably meet water quality requirements during both dry and wet seasons of the year. The report is scheduled



SEBASTOPOL URBAN SERVICE AREA

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for completion in February, 1974, with construction of facilities to be completed prior to July 15, 1974. Means to reduce the amount of water - or to reuse water - in cannery operations are under study by a consultant, and assuming a feasible method is arrived at, problems of contamination of surface waters in the Laguna should be substantially resolved.

The Water Quality Control Board is beginning to regulate dairy operations in order to prevent future surface water contamination brought about by runoff from livestock holding areas. Proposed action would consist of paving of livestock holding areas so that they can be systematically rinsed off, with subsequent onsite processing of waste for spray irrigation. If waste water thus generated can be used for spray irrigation, subject to proper management practices, the costs of compliance with Water Quality Standards could be somewhat offset by increased fodder production and decreased irrigation costs.

Apple producing areas to the south, west, and north of the City of Sebastopol, in addition to providing a scenic and economic resource to City residents, also serve to recharge ground water to the Merced formation, from which the domestic water supply is drawn. Encroachment into these areas by residential subdivisions, roads, and other paved areas would have an incremental effect on the amount of water recharged to the aquifer, particularly if this becomes a trend over successive decades. More private wells and more private septic systems could, at some point in time, have further diminishing and degrading effects on the area's water supply.

The City has an engineered underground storm drain system in most of the urbanized area, supplemented by natural waterways. Water collected into this system does not cause erosion and is discharged as "pure" water into the Laguna. Runoff from undeveloped areas may occur as sheet flow or may be channeled into gullies and streams. Most of the City's urban service

area contains soils of the Sebastopol or Gold ridge series, which are highly erodable because of a sandy base containing very little clay in the top 6 inches. This would indicate that as development takes place in the community, erosion problems may crop up from time to time during periods of heavy runoff, with subsequent deleterious effects on land forms (gullying) and natural waterways (siltification).

Recommendations - In meeting its ongoing responsibilities, the City government is fully aware of future water service requirements and has taken or is taking steps to meet Water Quality requirements for upgrading of waste water treatment facilities and to extend sewer and water services to unserved areas, particularly where health problems exist. Future policy decisions will have to be based on technical studies which are still being prepared and on findings and decisions by other independent agencies, so it is inappropriate to suggest specific technical measures relative to expansion or extension of water, sewer, and waste water treatment facilities. However, other recommendations are given relative to protection of the water resource generally:

1. Recharge area - Encourage the County of Sonoma to maintain Agricultural Exclusive (AE) zoning in the apple producing areas surrounding the City in order to preserve and protect water recharge capabilities into the Merced formation. A 40-acre minimum lot size would be most appropriate for this purpose; however, upon demonstration by an applicant that a given property sought to be subdivided is not suitable for agriculture and has adequate water supply and capability for septic percolation, AE-B5 (5 to 10 acre minimum) zoning could be considered. While this would indicate lot sizes somewhat in excess of those recommended in the Open Space Element - and larger than the proposed "rural ranchette" lot size - it appears justified on the basis of protecting recharge to the aquifer, reduc-

ing possibilities of ground water contamination, reduction of erosion, and protection of the agricultural resource (as will be discussed in a following section).

2. Waste water treatment - Prevail upon the North Coast Regional Water Quality Control Board to extend the deadline for compliance with the toxicity and discharge requirements to May 15, 1976, in order to give the City of Sebastopol time necessary to make decisions, secure funds, and proceed with designs and construction. Abatement of pollution is a long term objective which cannot always be accomplished quickly, no matter how desirable that might appear.

3. Septic systems - Support revised public health regulations requiring engineering analysis of soil percolation capabilities for new septic systems, in order to prevent further recurrence of septic system failures. Where extensive failures exist, assist the County Health Department by offering to extend sewers (subject to connection fees) as an alternative to abatement.

4. Drainage and erosion controls - In addition to expansion of the storm drainage system in pace with urban development, natural waterways should be protected against stripping of vegetation, and grading practices should be regulated by authorizing the City Engineer to require engineer certified grading plans for all developments on sloping sites or in areas where erosion has in the past presented problems. In reviewing specific plans for development in hill areas, special consideration should be given to requirements for "energy dissipators" to slow erosive velocities of runoff water. Planting of ground cover should be required on all exposed soil surfaces.

Relationship to Agriculture

Summary - Irrigation of pasture lands can produce two fodder

crops annually, with substantial savings to the dairy industry, which must presently import much of its hay and alfalfa from the Central Valley. Secondary treated effluent is and should continue to be available for irrigation purposes. Producers are also drawing directly from the Laguna de Santa Rosa to irrigate pasture for dairy fodder. The City of Santa Rosa, in response to Water Quality Control Board directives, is considering total elimination of discharge of treated effluent into the Laguna, which would in turn reduce summer water levels and the supply of irrigation water to these specific producers, but with overall substantial increase in the amount of irrigated land in Sonoma County.

Discussion - Irrigation of pasture land with waste water could produce additional fodder for the dairy industry. The industry is identified as the biggest in Sonoma County, generating income of $31,000,000 in 1972 and producing $121,000,000 a year in economic activity. Multi-purpose benefits possible: cheaper fodder, elimination of the need to import fodder, reduction in irrigation costs, retention of scenic open space, and a practical means for waste water disposal. An exhaustive environmental impact report and alternative waste water project analysis prepared for the City of Santa Rosa points very favorably to this method of waste disposal as part of an overall waste water management program. Whether or not the City of Sebastopol connects to the Santa Rosa treatment plant would be irrelevant from a standpoint of agricultural productivity, since Sebastopol's alternative plan is to construct its own new treatment plant with spray irrigation for disposal of effluent on a site in excess of 400 acres south of Highway 12 and west of Llano Road.

Disposal of some tertiary treated effluent at Santa Rosa's Laguna Treatment Plant (projected at approximately 5,000,000 gallons per day year-round) would serve to retain water levels

in the Laguna but would probably not provide sufficient water for withdrawal by farmers with irrigation rights if water levels to protect wildlife habitat were also to be maintained. While costs of piping secondary treated irrigation water to these farmers would appear to increase Santa Rosa's water processing costs, tertiary treatment of sufficient amounts to permit continued withdrawal could be even more costly.

Management of spray irrigation areas is most critical in the Wright soils area of the Laguna, commencing with initial analysis of soil percolation capabilities and continuing to prevent saturation, ponding, and discharge of secondary treated effluent into waterways, which might result if an irrigated area received excessive quantities of water over a short period of time. Excess saturation also makes harvesting of fodder very difficult. Management programs, therefore, would have to include provisions for rotation of irrigation on sufficient land to accommodate peak periods of waste water disposal.

Recommendations - The following courses of action are recommended as a means to conserve agricultural resources through disposal of waste water:

1. That the City of Sebastopol assign priority to implementing plans to construct its own waste water treatment plant with managed spray irrigation disposal of secondary treated effluent, provided soil capabilities are sufficient to absorb peak flows.

2. That the City encourage the City of Santa Rosa to provide tertiary treatment to a portion of the waste water to be handled at the Laguna Plant, in order to maintain summertime flows in the Laguna. Tertiary treatment of 5 million gallons per day at Santa Rosa's Laguna plant has been indicated as feasible in conjunction with a spray disposal program for the balance of treated effluent, some of which

should be piped to serve agricultural producers in the immediate Sebastopol area.

Relationship to Wildlife

Summary - The Laguna de Santa Rosa is a unique wildlife area dependent on a varying year-round supply of water to maintain wetland characteristics and a habitat for birds, animals, and fish. Diminution of the water supply during summer months will have a direct effect on wildlife characteristics and on the supply of food that the Laguna presently produces for wildlife, both in the immediate area and in flow to the Russian River. Increase in the water supply will have the reverse effect.

Discussion - Prior to the construction of the Santa Rosa Creek Flood Control Channel, northerly portions of the Laguna afforded a rich and abundant habitat to varied plant and animal species, including numerous species now identified as endangered. From a biologist's point of view, the additional drainage of lands in the Laguna area made possible by this improvement had an adverse effect on wildlife habitat, while on the other hand it made possible the expansion of agricultural activities and afforded additional flood protection to Santa Rosa residents. Recent actions by the Water Quality Control Board to enforce water quality standards could have mixed effects: (1) eliminate water pollution in the Laguna to protect wildlife, and (2) substantially reduce the summertime flow of water into the Laguna, with adverse effect on wildlife.

It is possible, but not likely, that disposal of all waste water generated by Santa Rosa, Rohnert Park-Cotati, and Sebastopol will be by spray irrigation at some future time, which would cut summertime flows in Santa Rosa Creek by 75% and flows in the more southerly portions of the Laguna by an

undetermined percentage. This would have an undesired effect on wildlife habitat and productivity. Still, increased areas of spray irrigation will provide new habitats for other types of birds and animals, which should partially offset these effects. A balance between spray irrigation disposal and tertiary treatment with discharge to the Laguna would appear most beneficial as a means of reconciling waste treatment requirements and wildlife requirements.

The natural flood plain characteristics of the Laguna enhance wildlife productivity in the wintertime. Smaller animals are able to scurry to higher ground while aquatic creatures flourish. The flood plain is obviously not suited for urban development.

Recommendations - In view of the important and direct relationship between water and wildlife, the following recommendations are considered of primary importance:

1. That the California Department of Fish and Game be consulted relative to a water management program in conjunction with a game management program (see following general section on Wildlife) in the Laguna area, which would include year-round discharge of tertiary treated water to the Laguna from the Santa Rosa Sewage Treatment Plant and possibly check dams along the Laguna to retard the rate of flow during summer months. Cooperation between the City of Sebastopol, the City of Santa Rosa, the County Farm Advisor, and the Sonoma County Water Agency would be necessary to plan and carry out such a program.

2. That the City of Santa Rosa be requested directly to provide assurances that, as water quality control standards are met, summertime flow to the Laguna will be maintained in sufficient quantify to support wildlife populations.

Relationships to Scenic Quality

Summary - Implementation of water management programs as discussed previously - waste water disposal, protection against erosion, protection of recharge areas, and retention of wildlife habitat - will produce secondary benefits through preservation and enhancement of scenic quality, particularly in future years when open space will be even more appreciated in face of pressures for urban expansion. Flood plain management will provide a supplemental benefit in maintaining scenic areas.

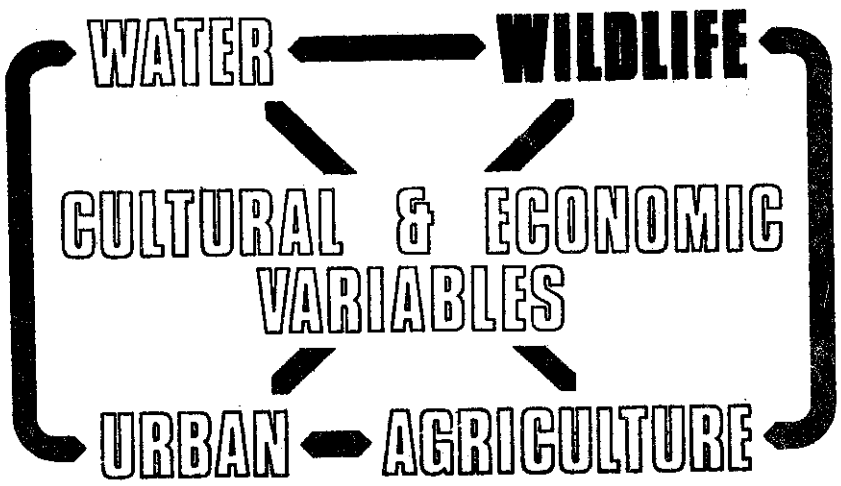
Discussion - While the Laguna and the Atascadero drainages are important areas from a standpoint of wildlife habitat, water recharge, and agricultural production, they also serve as storage reservoirs during flooding periods.

The Laguna flood area is presently designated with County F-1 and F-2 flood plain zones to protect against loss of life and property during periodic floods. The extent of flood potential in the Atascadero drainage is not known, since a "backwater curve" has not been calculated, but periodic inundation of lower lying areas is common knowledge.

The Warm Springs Dam is expected to be completed by 1979, and this facility will provide supplemental protection to the Sebastopol area through lowering of flood levels in the Laguna. While it will have no noticable effect during conditions of "ordinary" flooding, it is expected to reduce water levels by up to 4 feet during a "standard project flood". During floods such as occured during December, 1955, water levels would be reduced by 3 feet. The designated flood plain boundaries would not be altered, so construction of the dam would not generate any effects detrimental to the scenic qualities of the area.

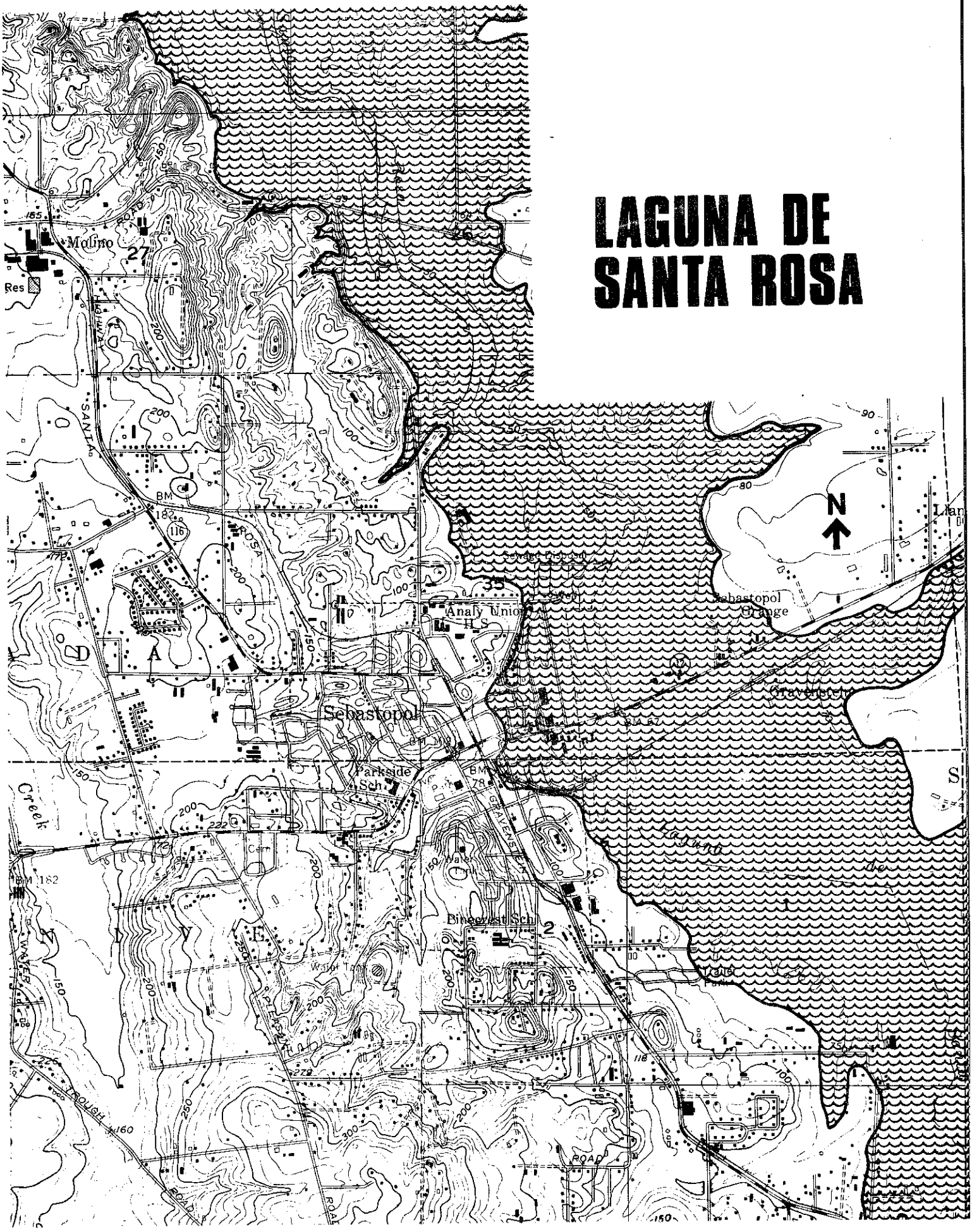
Recommendations - The Sonoma County Water Agency should be

requested to calculate a backwater curve for the Atascadero drainage, with subsequent delineation of boundaries of a flood plain zone to be presented to the Board of Supervisors for approval.



WILDLIFE

While wildlife conservation in the Sebastopol area may appear superficially to have only limited value in providing cultural and recreational benefits, conservation actions have practical benefits at least equally as important as man's emotional attachment to nature's creatures. The Laguna de Santa Rosa (defined for purposes of this study as the area within the 76-foot contour line) is a very important area both for propagation of wildlife and production of aquatic-based food, which in turn benefits commercial fisheries through maintaining fish populations in the Russian River, identified by the State as a "premium" waterway for wildlife, scenic, and recreational purposes. Through a series of interlocking cycles, migratory birds that periodically inhabit the Laguna provide benefits to agriculture (insect control) and the recreation industry (duck clubs). Intangible benefits of wildlife preservation are derived from man's appreciation of nature's way



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and the fact that such knowledge and understanding may be influential in important future decisions affecting the well-being of our society.

Relationship to Water Resources

Summary - The Laguna de Santa Rosa has been identified as the second most important "riparian" habitat in the state. The climate is somewhat cooler than along waterways further north and south of Sebastopol, allowing for a wider variety of plant and animal species to flourish. Riparian habitats consistently produce the highest quantity and quality of food to support wildlife and they are exceedingly complex and fragile in terms of interrelationships between living organisms, including man in particular.

Over 250 bird species have been identified in the Laguna, which rates this area as a truly outstanding and unique wildlife habitat when contrasted with other parts of the state. Stable conditions can be maintained and enhanced only if the supply of water in the Laguna is carefully managed, since due to marshy, shallow water conditions in much of the area, fluctuations in water level could quickly destroy extensive areas of habitat.

Discussion - Alternative waste water management and disposal programs being considered by the City of Sebastopol and the City of Santa Rosa in response to Water Quality Control Board directives could result in a diminished summertime flow in the Laguna, with consequent reduction of habitat and food production to support wildlife. In the event that the City of Santa Rosa should discharge up to 5 million gallons per day (7.7 cubic feet per second) of tertiary treated effluent from its expanded Laguna Treatment Plant, adequate water levels could be maintained and perhaps improved through the construction of small check dams along the drainage, provided there were sufficient rate of flow to prevent growth of algae.

Recommendations - In light of the above it is recommended that the California Department of Fish and Game commence a water and game management planning program in conjunction with other agencies and jurisdictions, including consideration of summer water requirements in the Laguna, alternatives for supplying water to farmers (direct withdrawal from the Laguna or piping from Santa Rosa's sewage treatment plant), means of containing water in the Laguna (check dams), wildlife habitat requirements and flood control maintenance requirements.

Relationship to Agriculture

Summary - Riparian habitat has been significantly altered due to agricultural intrusion into the Laguna, and by the flood control project along Santa Rosa Creek, which drained some areas that had previously been maintained naturally in a wet condition. This has been offset to some degree by the availability to wildlife of certain species of grain and other foods where field crops are being produced, but the competition between agricultural use and wetland status is evident.

Discussion - The Laguna functions as a flood plain in the wintertime, but during the summer, when the area dries out, and when the wetland habitat is most marginal, agricultural uses predominate. Further drainage of wetlands to allow extended agricultural use, coupled with drawing of water from the Laguna for crop irrigation, has a direct negative relationship to wildlife conservation. On the other hand, overreaction to the needs of the wildlife population could produce results adverse to the basic agricultural needs.

A riparian habitat is analagous to a power line, where if only a fraction of an inch is removed out of hundreds of miles of cable, a critical linkage is broken. This is a very fragile linkage, and if it is maintained, power for productivity is

likewise maintained. Riparian areas have the potential, acre for acre, of the highest wildlife productivity of any habitat, unless the power line is disrupted.

A most important aspect of a riparian habitat is its "edge", which allows for protected movement of wildlife up and down the stream and for interaction between land species, amphibians, and aquatic species. If such an "edge" could be created and maintained throughout the length of the Laguna, possibly by the planting of natural cover along fence rows in agricultural areas and by allowing natural vegetation to re-establish itself in some of the lower lying cultivated areas, the balance between man and nature would be greatly strengthened. The extent to which agricultural land might be taken out of productivity is not known, but means should be found to compensate affected agricultural interests for any real losses sustained, including possibly extension of agricultural uses into areas of marginal value for wildlife habitat.

Agriculture and wildlife come into contact in other portions of the Sebastopol area: in the immediate City environs, where both are diminishing as a result of intrusion by urban development, and in the apple-producing areas around the city, where, with the exception of the Atascadero, spraying of pesticides has had a marked effect on the diminution of songbirds. Effect of such chemicals on wildlife goes far beyond the scope of this report and is basically of regional, state, and national interest.

Recommendations - With reference to the aforementioned water and game management plan, there should be included in this study assessment of alternative means to provide the necessary "edge" for wildlife movement and to define the natural habitat, as well as consideration of selected areas either for habitat enlargement or for additional agricultural use.

Relationship to Urban Resources

Summary - In the Sebastopol area, expansion of urban development per se has nominal effect on wildlife. However, considering that the net result of urbanization is people, who in turn seek recreational opportunities such as hunting, contacts between wildlife and people most often result in adverse effects on wildlife.

Discussion - Trespassing, indiscriminate hunting and poaching have markedly affected wildlife in the Sebastopol area, particularly in the Laguna. All species that inhabit - or try to inhabit - the area are subject to illegal hunting pressures. This includes endangered species such as the Peregrine Falcon, the Trumpeter Swan, and the Osprey, all of which have essentially lost their habitat because of these pressures. Numerous exotic, rare, and endangered plant species have also been identified in the Laguna.

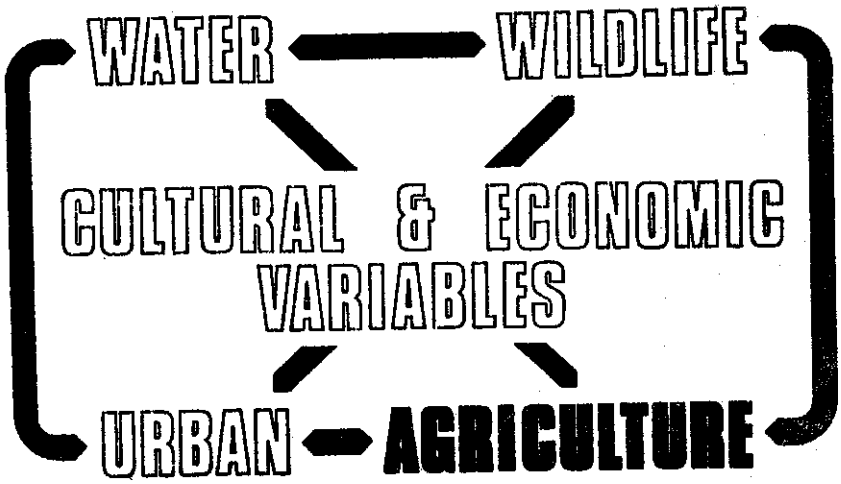
Jurisdiction over the Laguna area is a confused issue due to the various public and private interests represented there. There is essentially no patroling, and private property owners who have tried to take matters into their own hands have actually been threatened by irresponsible "hunters" so that now a detante has been reached, where some property owners are bullied and others shoot first. The rights of these land owners, whether they sanction hunting or wish to totally preserve natural conditions, must be protected. This does not necessarily mean hunting or nature related recreation is ruled out, but only that sufficient safeguards are required to insure that it is practiced in a reasonable manner through management programs and limited access. Property owners in the Laguna are in full support of such measures.

Recommendation - As part of the aforementioned water and game management plan, there should be determination of necessary regulatory measures and policing requirements. The total area

could be designated as a limited game preserve, with general hunting prohibited and licensing of hunting rights to individual property owners who could then sublet these rights to limited responsible parties (such as duck club memberships), or the owners could retain the rights and restrict hunting on their property altogether. This would serve to make predictable the amount of hunting pressures that would be applied to the area and could substantially reduce the threat to endangered species that might then re-establish themselves in the Laguna.

Cultural and Economic Relationships

Philosophy - Protection of wildlife habitat in the Laguna would require economic give and take between public agencies and agricultural interests. Some of the giving required by farmers might be in part compensated for by granting of exclusive hunting rights or direct compensation through public purchase. Cultural benefits derived from the retention of this unique and highly significant habitat would be preservation of scenic quality and, most importantly, perpetuation of a living laboratory for environmental studies. Indirect economic benefits would be increase of the food supply grown in the Laguna and transmitted to the Russian River, with corresponding enhancement of fisheries, plus the propagation of increased quantities of water fowl to be harvested throughout California.



AGRICULTURAL RESOURCES

The agricultural industry - apple production and dairies - is significant not only as a major sector of Sebastopol's economic base but in relation to conservation of water, wildlife, and scenic resources.

Relationship to Cultural and Economic Resources

Summary - Agriculture is a cultural and economic resource. The heritage of working the land for the production of food is strongly reflected in the way of life in Sebastopol today and should continue to be a dominant influence for decades to come. Apple production alone contributes $4 to 7 million annually to growers and a gross economic product of $25-35 million in the community, considering direct and indirect expenditures for processing, shipping, etc. Apple producing areas help strengthen the identity of the City of Sebastopol by surrounding the community with an open space framework. Dairy operations in the Laguna are important economically and reinforce the rural atmosphere of the community.

Encroachment by urban settlement into apple producing areas poses problems of compatibility, since spraying of orchards constitutes a nuisance to nonagricultural residents. Development of lot split subdivisions could significantly reduce the amount of agricultural land in production, which would indicate a basic conflict between real estate pressures and agricultural needs, particularly since with residential development, land values appreciate, and taxes are increased commensurately. Profits from subdivision and resale of residential lots are a one-time windfall, whereas sustained agricultural use may produce, over the years, many times the economic benefits to the community, particularly since the cannery operation is dependent on a constant or even increased quantity of raw materials. Residential development also detracts from the scenic quality of the agricultural area and could have adverse effects on recharge of ground water to the aquifer.

It is assumed that since the Laguna de Santa Rosa is a flood plain, agricultural operations will not be affected by the threat of residential intrusion. However, the interface between agricultural and wildlife areas needs to be stabilized for the benefit of both resources.

Discussion - The Merced formation and overlying Goldridge and Sebastopol soils, coupled with climatological characteristics of the area, combine to create ideal conditions for the continued production of Gravenstein apples in areas to the south, west, and north of the City of Sebastopol. The most significant apple orchards of the region are outside of the Sebastopol urban service area. Orchards remaining within the City have generally been allowed to decline and are subject on all sides to urbanization pressures. It is assumed that these orchards will be phased out in time but since urban services will not be extended outside of the Sebastopol drainage, that apple production is and should continue to be the predominant use of land around the City.

A number of inconclusive studies have been conducted relative to the actual extent of lot splitting activities in existing orchards. Viewpoints vary as to how much of this activity has actually occured, and with what deleterious effect. There is general agreement, though, that as economic pressures on an individual apple producer create immediate financial demand (such as imminent retirement or a bad crop year) there is strong incentive to the owner to speculate on the development of the property or to sell it for the same purpose. So over the next several decades, whether or not trends are strongly established at the present time, there is reason to believe that incremental subdivision activities could take sufficient land out of apple production to weaken the agricultural economic base.

The amount of land necessary for a self-sustaining apple operation is in the neighborhood of 40 acres. This scale of operation would support one family, allowing for expenses of spraying, harvesting, and so forth. Reduction of orchard land into smaller sized parcels - even ten acres - would gradually undermine the viability of apple production by increasing production costs above market returns.

Recommendations - The following recommendations are directed specifically toward the goal of retaining and hopefully strengthening the agricultural economic resource, while recognizing the other benefits to be gained from the implementation of these suggested policies:

1. Encourage the County of Sonoma to apply Agricultural Exclusive (AE) zoning with a 40-acre minimum lot size to identified apple producing properties in the Sebastopol area with allowance for ten-acre minimum lot size on sites adjacent to orchards but lacking agricultural potential.

2. Support the issuance of new Williamson Act contracts for the protection of prime orchard areas.

Relationship to Water

Summary - Apple producing areas do not require irrigation water. Fodder producing areas in and around the Laguna de Santa Rosa could provide an additional crop each year if water were available for spray irrigation. Increased fodder production is important to the dairy industry. Some producers rely upon withdrawal from the Laguna de Santa Rosa for their irrigation water supplies.

Discussion - Waste water disposal methods contemplated by the City of Sebastopol could provide for harvest of two additional fodder crops from up to 400 acres of land, in support of the dairy industry. Industrial waste water irrigation presently being carried out (and subject to expansion) should increase productivity. It is not anticipated that surplus effluent will be available for sale or free distribution to farmers from the Sebastopol waste water treatment process, although the City of Santa Rosa is considering this as a possibility in connection with its Laguna Sewage Treatment Plant operation. If the City of Santa Rosa elects not to recharge tertiary treated water to the Laguna in sufficient quantities to sustain wildlife and to support continued withdrawal of irrigation water by farmers with water rights, there is a possibility that controversies could develop over prior rights and that agricultural or wildlife values - or both - could suffer, unless a supplemental supply of secondary treated water is piped by Santa Rosa directly to agricultural producers in the Sebastopol area.

Recommendation - That transportation via pipeline from the Santa Rosa treatment plant of secondary treated wastewater to farmers be a prime consideration in formulation of a Laguna water management plan.

Relationship to Urban Resources

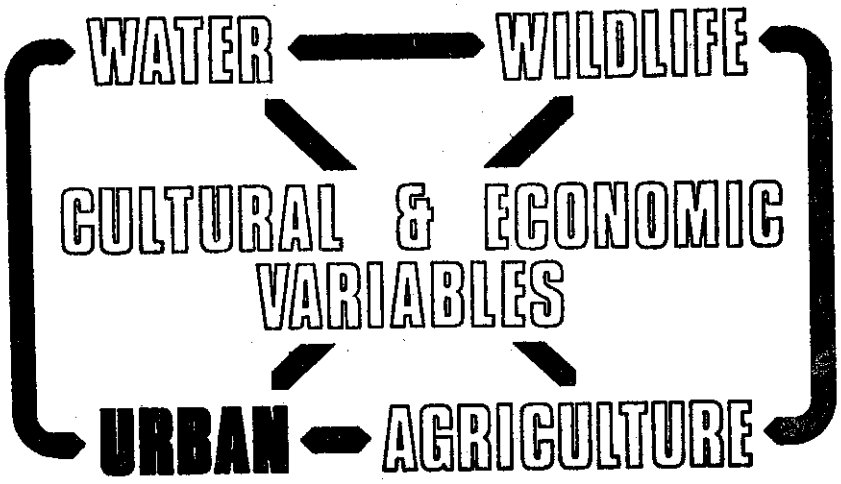
Summary - Agriculture competes with development for supply of land. The Sebastopol sewer service area, where urbanization is projected, contains an undetermined amount of still productive agricultural land - probably 300 to 400 acres. However, the productivity of the orchards is diminishing, and pressures are placed on these properties because of demand for developable land and real property tax increases.

Discussion - While it is likely that some orchard production will continue within the urban service area for many years to come, agricultural activities will be employed mainly as an economic stopgap to pay taxes until these properties are developed. If periodic spraying operations are continued in order to protect the crops, there would be increased friction with adjacent urban land use since spraying has nuisance effects. As the City grows, extension of utilities past orchards to new subdivisions will be costly.

Recommendations -

1. That the City of Sebastopol make no special effort through its zoning policies or otherwise to retain apple orchards within the service area in a productive capacity. Actually, the City should encourage timely development of these orchards so that utility services could be extended in an orderly manner. The obvious exception to these policies would be more significant portions of the Burbank Experimental Gardens which have historic as well as agricultural value.

2. That the City adhere strictly to its policy of a limited sewer service area in order to deter further encroachment into immediately contiguous agriculturally productive areas, thus clearly delineating the boundary between urban development and agriculture.



URBAN RESOURCES

Land for development is the most basic urban resource, followed closely by a support system of streets, water, and sewer and utility services. Social and cultural elements are also considered as urban resources: recreational facilities, historic sites, scenic areas, wildlife areas, and natural waterways. Flood detention areas adjacent to the urban settlement are a resource both in a scenic sense and in that they define limits of urban expansion.

Relationship to Water

Summary - The reliance of the City of Sebastopol on municipal wells as a source of water for domestic consumption and programs to provide adequate treatment of waste water have been discussed previously. The option of whether or not to accept supplemental water supplied via the Sonoma County Aquaduct after 1985 constitutes potentially an additional reserve to meet domestic needs. Flood prone areas to the east and west

constitute boundaries to limit urban expansion and define the City, while natural waterways within the City help to control erosion and provide aesthetic benefits.

Discussion - Provision of expanded water, sewer, and waste water treatment facilities as the community develops is within the range of standard - although difficult - engineering practice.

The flood zones in the Laguna are expected to be maintained, although if the City of Sebastopol should annex any territory in the Laguna, similar protection would have to be afforded under City land use controls. The Atascadero backwater curve has not been calculated; a determination should be made of flooding potential - and hence potential green belt area - in this drainage since there are strong pressures for development in portions of the Atascadero.

Because of the high erodability of Sebastopol and Goldridge soils, drainage and erosion considerations in new and existing subdivisions will be a matter of continuing concern, and creek bank stabilization and protection along natural waterways, to prevent downstream siltification and clogging up of storm drains, should systematically be carried out.

Recommendations -

1. That the City of Sebastopol, if it intends to annex any territory in the Laguna, either adopt a flood plain zoning ordinance similar or identical to that of Sonoma County; or that any such annexation by subject to recordation of covenants, conditions, and restrictions that land use will be regulated in total conformity with the provisions of the County's flood plain zones. Due to probable limited incursions of City territory into the Laguna, the latter course would probably be the simplest.

2. That the City request the Sonoma County Water Agency to

make a determination of flooding limits in the Atascadero drainage so that appropriate flood plain zoning can be applied there.

3. That the City's subdivision ordinance clearly reflect that the City Engineer may require engineered grading plans and proposals for soil stabilization (ground cover) in all new subdivisions or developments in order to minimize potential erosion.

4. That City policies on design review or subdivision approval require retention of natural waterways in basically a natural state - including nonremoval of native vegetation - unless the applicant can clearly demonstrate that alternative landscaping and channelization proposals are in the public interest and will be more effective for purposes of erosion control.

Relationship to Wildlife

Summary - Intrusion of residential development or other urban land use into previously natural or agricultural areas has a diminishing effect on wildlife habitat.

Discussion - The projected expansion of the Sebastopol urban area is relatively insignificant in terms of the total land area west of the Laguna. While certain wildlife species will disappear from within the City limits, they in turn will be replaced by others more adaptable to an urban environment, provided that natural vegetation is retained generally, augmented by ornamental landscaping and new tree plantings.

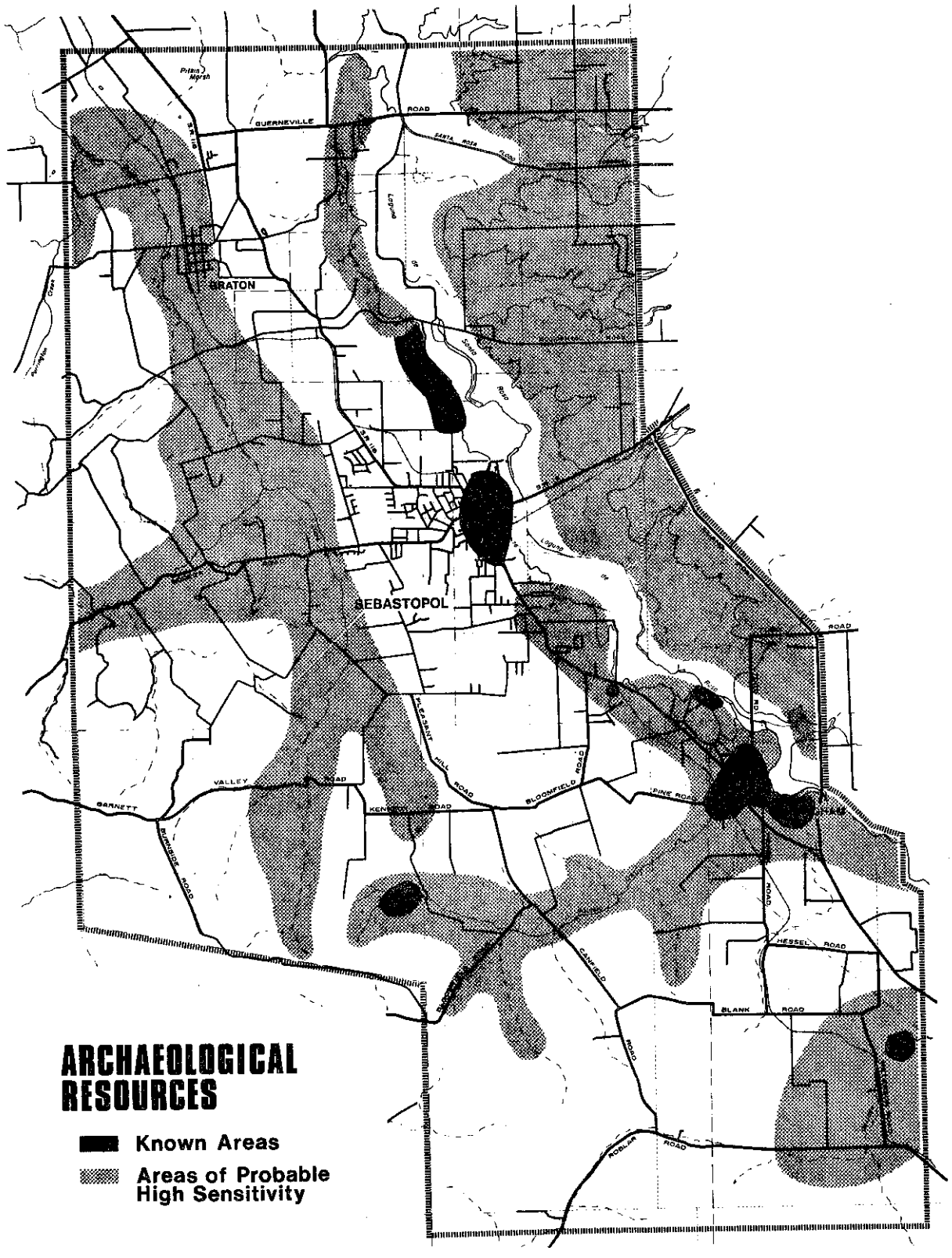
Recommendation - That the City of Sebastopol, through its zoning, subdivision, and design review procedures require retention of existing natural vegetation (except nuisance species) in all new developments and that specific provisions be made for new plantings of street trees.

Cultural and Economic Relationships

Summary - Scenic values of the Laguna and Atascadero drainages - and of apple producing areas surrounding the City - are well established, and retention of these areas will have long term cultural benefit. The City of Sebastopol and adjoining areas are relatively rich in archaeological potential. Citizens enhibit increased awareness of the value of archaeological resources and the need to conserve them. The Enmanji Temple and the Burbank Experimental Gardens are identified as historic sites, and there is no indication that either of these is threatened. Mature stands of natural vegetation, particularly along the crests of hills running north and south through the City, highlight the gently rolling terrain and substantially reduce the visual impact of urbanization.

Discussion - Archaeological resources are not protected by local or County ordinance. Where Federal funds are involved in any public works program, the Federal Antiquities Act requires protection of any significant site, either through nondisturbance or thorough field investigation. This provision may apply to future federally assisted City public works projects. There is need for increased knowledge and public awareness of how to act in the event an archaeological resource is discovered.

Field reconnaisance of the community indicates that while there are interesting examples of 19th century architecture, including old carriage houses, these buildings have primarily aesthetic and sentimental appeal but no true historic value in terms of historic preservation criteria. As time passes and pressures to redevelop some of these older areas increase, no doubt local historical interests will be able to unearth historical background data not presently available, which may in turn lead to designation of additional structures and sites as historically significant.



SEBASTOPOL GENERAL PLAN AREA

GENERAL PLAN
CONSERVATION ELEMENT

PREPARED BY:
DONALD H. LAIDLAW & ASSOCIATES
SANTA ROSA, CALIFORNIA · 1973

Urban vegetation in the City of Sebastopol does much to give the community its character and rural atmosphere. While most trees are on private property, existing street trees enhance residential neighborhoods and continue to benefit growing areas. Encouragement of additional landscaping (particularly tree planting) by ordinance or coercive policy would improve overall appearance: nothing is as effective in overcoming monotonous building design as mature landscaping - it is like the frosting on the cake.

Recommendations -

1. That whether or not an environmental impact report is required, there be a requirement that for any public works project or private development undertaken in the City of Sebastopol, onsite archaeological reconnaisance be conducted prior to completion or approval of development plans. Reconnaisance should occur at the earliest possible date while project plans are being formulated and can be accomplished at relatively little expense, since such services can usually be obtained through Sonoma State College.

2. That a community service organization be requested to sponsor a public information program on archaeology. This would entail a certain amount of work with archaeologists. The program could culminate in the publication of a brochure or newspaper article pictorially identifying items of archaeological interest and advising property owners of whom they should contact in the event an archaeological discovery is made.

3. The City should adopt an "Urban Vegetation" ordinance or policy including the following provisions:

   a. Identification of tree species deemed desirable (such as pines and redwoods) and those deemed to be a nuisance (such as acacia and walnut).

   b. Prohibition of cutting of street trees either on or

immediately adjacent to City street right-of-way, unless they are of a nuisance variety or a determination is made by the City Manager that their continued existence constitutes a public health or safety hazard or contributes significantly to destruction of public or private property. The City Manager's decision could be appealed to the City Council.

c. Prohibition of cutting of specimen trees (except nuisance varieties) exceeding 30" in circumference measured 1 foot above the ground, in all proposed developments, whether or not zoning, use permit, subdivision, or design review approval is required. This would be enforced by the Building Inspector.

d. Designation of natural waterways remaining in the community, and prohibition of stripping of brush and tree removal unless the applicant can demonstrate to the City Manager, with appeal to the City Council, that the proposed alternative is in the public interest and will not impair visual quality of the area.

e. Require that in all new residential subdivisions space be provided for planting of selected species of street trees along rights-of-way. Tree types that spread roots close to the surface should not be permitted.

RECOMMENDED PRIORITIES AND IMPLEMENTATION PROGRAM

Implementation of priorities could proceed on several fronts simultaneously and would require multi-jurisdictional coordination. Highest priority measures are as follows:

1. Complete the planning, funding, and construction of expanded wastewater treatment facilities, either independently or through connection to the Santa Rosa Laguna Sewage Treatment Plant. The Water Quality Control Board should be prevailed upon to extend performance deadlines to May 15, 1976, in order to provide a realistic time schedule to accomplish this work. If such an extension cannot be granted, an impasse would be created which could impair the effectiveness of program implementation.

2. Bring together a planning group consisting of Sebastopol City officials, Santa Rosa City officials, and officials of the Sonoma County Water Agency, the Sonoma County Farm Advisory Bureau, the North Coast Regional Water Quality Control Board, and the State Department of Fish and Game for purposes of formulating a planning program leading to a coordinated water and game management program in the Laguna de Santa Rosa. Property owners should be called upon to provide their input. The Department of Fish and Game should be the lead agency responsible for organizing the study group, incurring of planning costs, and preparation of final plans, since it will in all likelihood have on-going responsibility for management and policing, which will in turn benefit other areas within its jurisdiction, particularly the Russian River. Planning Departments of the City of Santa Rosa and Sonoma County can be called upon to provide technical information and data accumulated in the course of their open space and conservation studies.

A water and game resources management plan would consider the following:

a. How much water flow to the Laguna will be reduced by implementation of expanded and upgraded regional waste water treatment programs.

b. How much water is required during the dry season in the Laguna to maintain and possibly enhance wildlife habitats.

c. Appropriate hunting and public access controls and enforcement jurisdictions in the Laguna.

d. Measures necessary to create an "edge" of natural vegetation along the Laguna in order to provide linkages between areas of wildlife habitat, and land area required to maintain habitat.

e. The effect of a water and game conservation and management program on existing agricultural operations and what compensatory measures - if any - would be appropriate.

f. Levels of maintenance required to provide adequate flood protection.

3. Request the County of Sonoma to re-examine zoning policies in the apple producing areas adjacent to the City, leading to new Agricultural Exclusive (AE) zoning designations with minimum lot size of 40 acres, but with possibility of density transfer to achieve higher development densities in selected locations with limited agricultural potential and where there would be no anticipated adverse effect on the recharge area or on ground water conditions. This is an evolving concept known as "impact zoning", under which properties can be treated differently depending upon the impact of alternative land use proposals. It should be stressed that the purpose of such large lot zoning is not to create a visual buffer zone or to institute exclusionary practices but that it is for the protection of critical resources: the apple industry, the ground water recharge

area and, to a certain degree, wildlife habitat.

4. Request that the Sonoma County Water Agency calculate a "backwater curve" for the Atascadero drainage, as the basis for County F-1 and F-2 flood plain zoning.

5. Compile and adopt an Urban Vegetation ordinance or policy elaborating on existing policies relative to street trees, specimen trees, protection of natural waterways and landscaping of new developments.

URBAN DEVELOPMENT AND RESOURCE ALLOCATION

Existing policies and programs for urban development in the City of Sebastopol should, if carried out, be well within ecological constraints and resource capabilities of the area. A good supply of water is available; sewage treatment plant capacity can be attained; wildlife populations can be maintained; agricultural productivity can be maintained; public safety hazards from flooding can be avoided; and cultural and scenic qualities can be enhanced. Population projections range between 15,000 and 18,000 persons in the urban service area by the year 2020; analysis of available land, population holding capacity, and areas likely to be redeveloped in the future indicates that the overall population density of between 12 and 14 persons per gross acre (including commercial, industrial, public use, and street areas) is consistent with density ranges in mature portions of stable, smaller communities and is far below the average big city population density. Since water lines, sewer lines, and storm drain facilities are being sized to accommodate this population, distributed in accordance with General Plan guidelines, it is probable that public facilities when completed will be adequate for an indefinite period of time.

Primary resource constraints on future development would be erosion control, retention of natural waterways, retention of natural vegetation, and protection of archaeological resources. These can all be handled administratively and by standard engineering practice. Conservation and enhancement of the visual environment can be attained through policies on urban vegetation.

ENVIRONMENTAL IMPACT OF URBANIZATION

Since a Conservation Element is intended to promulgate policies that would result in minimization of ecological disruption by future public and private development in the community, it is proper to anticipate the total environmental impact of future urbanization in accordance with existing and projected City policies.

First, unless there is neglect of vegetative, geological, or archaeological resources, it is not anticipated that future private development would have any adverse effect on resources, assuming sufficient sewer trunk and waste treatment capacity. That is not to say that other impacts might not exist, such as effect on traffic and schools, possible seismic hazard, or inappropriate design.

Public Works projects to be undertaken by the City of Sebastopol or other jurisdictions in support of urbanization should generally not have any direct adverse environmental impact, since traffic facility improvements will be aimed at reducing congestion; water and sewer improvements will be intended to increase capacity and to improve water quality while reducing health hazards; schools will be designed to maintain or upgrade the quality of education; and other public facilities will be in response to demonstrated need.

City policies to limit the extent of urbanization through restriction of the sewer service area, coupled with hoped-for County policies of low density zoning to protect the agricultural resource plus a coordinated management system for the Laguna, effectively define the parameters within which urbanization can take place, so that concern over growth-inducing effects of future public works programs becomes irrelevant. Therefore, except for archaeological reconnaisance and care

and sensitivity in design and construction of public facilities, it is not anticipated that further in-depth environmental review would be required as a condition precedent to construction of public improvements.

SUGGESTED REVISIONS TO EXISTING PLANS AND POLICIES

Urban Fringe Densities - The adopted General Plan indicates urban or semi-urban residential densities outside the limits of the Sebastopol urban service area, including substantial areas presently devoted to apple production. In light of identified conservation needs, such development would be inappropriate. The Open Space Element adopted by the City of Sebastopol in June, 1973, suggested that for retention of open space it would be desirable to increase minimum lot size to between 2 and 5 acres, with ten acre minimum lot sizes applied to agriculturally productive properties, in order to preserve rural amenity and to protect against health hazards from failing septic systems. A similar line of reasoning is reflected in the "rural ranchette" zoning concept now being discussed by Sonoma County. In light of basic requirements for sustained agricultural productivity, these densities would also appear inappropriate. Projected General Plan land use and densities within the ultimate growth area of the City would not be wasteful of resources.

The General Plan and the Open Space Element should be amended to take into consideration resource requirements for agricultural productivity, ground water recharge, protection against contamination of the water table, and productive wildlife habitat. This would indicate a 40-acre Agricultural Exclusive (AE) zone, with provisions for higher - but still rural - densities in selected locations where it could be demonstrated that there would be no adverse impact on apple production or ground water.

Laguna Recreation - The General Plan indicates potential public recreational use in the Laguna through a system of publicly accessible open spaces, including the possible dredging of portions of the Laguna to create a lake for water-based

recreation. In light of conservation potentials for wildlife and game management in the Laguna and since extensive public access would be incompatible with wildlife conservation, General Plan policies should be revised to delete further reference to general recreational use in that area.

The Open Space Element also suggests that the southerly portion of the Laguna might be adaptable at some locations to public recreational use. This possibility is not entirely ruled out; however, the findings of a planning task force study of a water and game management program in the area should dictate whether or not recreational use is appropriate and to what degree.

Planning Area Boundaries - Consideration could be given to readjustment of planning area boundaries westward to the centerline of the Laguna except where possible annexations by the City of Sebastopol might extend corporate limits beyond that line. It is believed that implementation of an environmentally sound management program in the Laguna will create a de facto multi-jurisdictional buffer between the City of Sebastopol and the west plains of the City of Santa Rosa, and that there is limited value in continued concern over land use policies beyond the Laguna itself. This should also be in harmony with the planning program of the City of Santa Rosa, which has prepared extensive land use studies leading to proposed open space and conservation programs in the West Plains (including 20-acre minimum lot sizes in the Laguna) which appear consistent with Sebastopol's General Plan.

SOURCES

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North Coast Regional Water Quality Control Board	Dr. David Joseph, Director Bob Tancreto David Snetsinger
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California Resources Agency	Robert Ford, Geologist John Putzerella
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Walt Smith, Illustrator

APPENDICES

1. Botanist's Notes on the Laguna de Santa Rosa
   - Peter Rubtzoff

2. Bird and Animal Species in the Laguna
   - Gordon Bolander

A FEW NOTES ON THE LAGUNA DE SANTA ROSA WETLANDS

The Laguna de Santa Rosa represents a sluggish moving stream flowing in a northwesterly direction along the western edge of the Santa Rosa Plain, and, with its numerous small tributaries, draining this plain. Along its course it is accompanied by a series of marshes, which at one time were much more continuous and extensive than now. In general, there was much more water in the area in the old days, like natural lakes and ponds which for the most part disappeared. Consequently the marsh vegetation and willow and alder thickets have become much less extensive and represent presently only disconnected last remnants of a once extensive swamp. Several years ago, when Sonoma County put a channel through the lower (and the widest and marshiest) part of the area, the marshlands and open water areas, which represent the last refuge for a large number of species of waterfowl, became even more reduced. Nevertheless, the Laguna de Santa Rosa may still represent one of the largest freshwater-marsh areas in the Coast Ranges, (and the southernmost of such a size), perhaps second in extent only to marshlands bordering the Clear Lake. The Clear Lake marshes, however, are less varied in their vegetational composition, representing mostly typical lake-shore wetlands. The Laguna de Santa Rosa, on the other hand, presents a wide range of ecological situations. Some areas, as the ones near Llano Road and near Laguna Road, represent permanently boggy ground fed by seepages or springs, with their characteristic flora. Most other areas are subject to seasonal fluctuation of the water-level and are inundated in winter and early spring and dry out gradually in the course of the later spring and summer, except for the main stream, which carries water throughout the dry season. In such areas open marshy, wet, and muddy flats alternate with thickets composed of many species of shrubs and trees, dominated by willows and alders. Marginal areas are covered by a great variety of vernal pool plants, annual species adapted to germinating in water in late winter or early spring, but spending the rest of their life on a gradually drying ground which becomes quite dry in the summer.

As far as geographical affinities of the flora are concerned, in the Laguna de Santa Rosa, as in other smaller marshes in this part of the County, the boreal (northern) element is common. During the last glacial period (ice age) in North America, California, although not glaciated except in the mountains, had a climate cooler and moister than presently and consequently a boreal (northern) flora was widespread. With the climate becoming warmer and drier following the ice age, this flora largely disappeared in California, except in higher mountains and some wet coastal areas that are subject to cooling by winds coming from the cold California Current. The Laguna de Santa Rosa is located in the so-called Petaluma Gap, the region between the coast and Sonoma Mountains, with only

very low outer Coast Ranges permitting the cool coastal winds to penetrate rather far inland. For this reason summer temperatures in the Petaluma - Santa Rosa region are considerably lower than both to the south (Novato, San Rafael) and to the north (Healdsburg, Cloverdale). This relative coolness of the region coupled with moisture in a marsh may account for the presence of boreal plants in the Laguna de Santa Rosa. A large number of northern plants are not known at all south of this marshland in the Coast Ranges, and are disconnected in an insular fashion from the areas of their more general occurrence farther north, as, for instance, Phalaris arundinacea, a tall circumboreal marsh grass which at places forms stands along the Laguna de Santa Rosa, but is not known farther south (and not known to me from any other marsh in the region. Other examples of such a distribution are: Glyceria elata, a showy mannagrass which has its southernmost outpost in the Laguna,) Eleocharis pauciflora, a circumboreal sedge not known south of the Laguna, and Sagittaria cuneata, a boreal North American arrowhead known from only two other places in the region, but not known south of it.

Besides, the Laguna de Santa Rosa is noted for a number of species generally known from more interior areas, especially the Central Valley, and having their westernmost outposts in our area. Examples of such plants are: Marsilea vestita, Nyosurus minimus, Navarretia Bakeri, Navarretia cotulaefolia, Allocarya stipitata.

Of rare or restricted plants occuring in the area may be mentioned: Limanthes vinculans, a species of meadow foam described by Prof. Robert Ornduff in 1969, which is a very narrow endemic and is known only from the Laguna de Santa Rosa drainage system; Carex albida, a sedge and another very narrow endemic, described from the Santa Rosa Creek and known otherwise only from the Pitkin Marsh; Carex Hassei, another sedge which is rare in the Coast Ranges; Scirpus fluviatilis, river bulrush, which is rare in the Coast Ranges, but forms extensive stands in the Laguna area; Sium suave, water parsnip, which is scattered and local in California; Elatine heterandra and Elatine californica, two waterworts which are scattered and uncommon in California; Pogogyne Douglasii subsp. parviflora, a mint known only from valleys in Mendocino, Lake, and Sonoma counties, and not known south of the Laguna de Santa Rosa, in which it colors the vernally wet borders purple at the time of flowering.

The variety of ecological situations represented in the Laguna de Santa Rosa (not commonly encountered in a single marshland) in combination with a rich flora having various geographical affinities and containing many rare plants and some narrow endemics, make this wetland a sort of a unique living museum, easily accessible to the public and ideal for popular education and studies by scholars and students (outdoor studies of nature,

field trips, guided nature tours, etc.). Indeed, nature lovers and biologists often look in far away places for good areas for their activities, and here we have such an excellent area in our own backyard in the midst of an exploding population. And we should be grateful that it is not yet totally destroyed and should hurry to save what is still left of it.

Peter Rubtzoff
July 1973

Birds of the Laguna de Santa Rosa with annotations resulting from 20 years of observing in the area.

Gordon L Bolander

Common Loon – Rare. Has occured during flooding. Winter
Horned Grebe – Unusual. Flooded areas. Winter
Eared Grebe – Uncommon. " ". Winter
Western Grebe – Unusual. " " "
Pied-billed Grebe – Common. Breeds on appropriate ponds. Year-round.
White Pelican. Rarely seen in flights over area.
Double-crested Cormorant – Uncommon. Flooded areas. Winter.
Great Blue Heron Common. Has nested near Occidental Rd and just south of Guerneville Rd. in recent years. Year round.
Green Heron. Common Summer season.
(Common) Great Egret – Fairly regular visitor. No nesting known.
Snowy Egret – Regular visitor – No nesting known.
Blk-cr. Night Heron – Year round. Probably nests.
Amer. Bittern – Year round in small numbers. Nests where fields remain flooded in spring. Has suffered considerably from reduction of habitat, i.e. flooded areas with tules, etc.
Whistling Swan – Occurs nearly every winter but rarely stays in the area due to small area of suitable feeding habitat and hunting pressure.
* Trumpeter Swan – Attempts to winter here but are disturbed greatly by hunting pressures. This just in past five years. Probably from the Malheur introduction in Oregon.
Canada Goose – Occurs in small numbers sporadically each winter. May stay in area for a while but usually just pass through
Black Brant – One record for this coastal species.

* INDICATES ENDANGERED SPECIES

Scrub Jay - Common Resident
Common Raven - Regular vagrant. Reduced in numbers since closing of dump at airport.
Common Crow - Abundant resident
Chestnut-backed Chickadee - Common resident
Plain Titmouse — " "
Bushtit — " "
White-breasted Nuthatch — " "
Red-breasted Nuthatch - Fluctuating winter visitor
Pygmy Nuthatch - Rare vagrant
Brown Creeper - Common resident
Wrentit - " "
House Wren - Uncommon migrant
Winter Wren - Common winter visitor
Bewick Wren Common resident
Long-billed Marsh Wren - Resident - Numbers reduced by reduction of marshy areas.
Mockingbird - Recent resident - Formerly winter only.
Calif. Thrasher - Local resident, brushy areas.
Amer. Robin - Common resident - Greatly increased in winter.
Varied Thrush - Common winter visitor.
Hermit Thrush - " " "
Swainson Thrush - " summer "
Western Bluebird - Uncommon resident
Blue-gray Gnatcatcher - Regular fall migrant in small numbers
Golden-crowned Kinglet - Common winter visitor

Hooded Merganser - A few noted each winter.
Common Merganser - A few during migration periods.
Turkey Vulture - Nearly always present. No nesting in area.
White-tailed Kite - Regular. Nests. Has roosted in large groups when field mice are numerous.
Sharp-shinned Hawk - Regular - Fall and winter
Cooper Hawk - " " " "
Red-tailed Hawk - Common resident
Red-shouldered Hawk - " "
Rough-legged Hawk - Unusual. Usually a fall migrant
Ferruginous Hawk - Rare fall migrant
Golden Eagle - Appears at any time of year. Unusual.
* Bald Eagle - Has wintered in area. Rare.
Marsh Hawk - Uncommon - Fall and Winter. Has bred in past years but suitable habitat now too restricted.
Osprey - Occurs fairly regularly during migration periods. Some through the summer to fish. No breeders in area.
* Prairie Falcon - Rare. Passes through.
* Peregrine Falcon (Duck Hawk) - Now quite unusual. Used to appear in fall and winter quite regularly during its feeding runs.
(Pigeon Hawk) Merlin - Occasional in winter and migration periods.
(Sparrow Hawk) Amer. Kestrel - Common, year round.
California Quail - Abundant where suitable cover is left.
Ring-necked Pheasant - A few persist. Need more wet areas in summer to be successful.
* Virginia Rail - Greatly reduced in numbers due to summer dryness.

* Sora. Unusual. Requires permanent flooded shallows with plenty of cover, i.e. grass, tules, cattails, etc.

Common Gallinule. Never a common winter visitor. Reduced in numbers as the years pass and habitat is reduced.

American Coot. Generally a winter species. Would breed if open water with tule borders was available.

Semi-palmated Plover - Rare during migration.

Killdeer - Common. Breeds.

Black-bellied Plover. Uncommon during migration. Has wintered over.

Common Snipe - Common in suitable wet grasslands in winter.

Long-billed Curlew - Unusual migrant.

Whimbrel - Unusual migrant.

Spotted Sandpiper - Uncommon migrant & winter. Little suitable habitat.

Solitary " . Rare. " " " " "

Greater Yellowlegs - Common. Migration periods. Some winter

Lesser " - Rare - " " -

Least Sandpiper - Fluctuates in numbers according to availability of exposed mud-flat areas during migration

Dunlin
Short-billed Dowitcher
Long-billed Dowitcher
Western Sandpiper } abb as above

American Avocet
Blk-necked Stilt } Rare migrants

Red Phalarope - Rare, following winter storms on coast

Wilson Phalarope - Rare migrant

Western Meadowlark - Common resident
Red-winged Blackbird - " "
Tricolored Blackbird - Uncommon vagrant
Northern Oriole (was Bullock's) - Common summer visitor
Brewer Blackbird - Common resident
Brown-headed Cowbird - Common resident
Western Tanager - Summer visitor to suitable habitat - (fir ridges)
Summer Tanager - Rare fall migrant
Blk-headed Grosbeak - Common summer visitor
Lazuli Bunting - Common migrant
Painted Bunting - One record
Evening Grosbeak - Winter visitor. Fluctuates widely.
Purple Finch - Common resident
House " " "
Pine Siskin " "
American Goldfinch " "
Lesser Goldfinch " "
Lawrence Goldfinch - Uncommon, irregular summer visitor
Red Crossbill - Irregular winter visitor
Green-tailed Towhee - One record
Rufous-sided towhee - Common resident
Brown Towhee - " "
Savannah Sparrow - " winter visitor
Lark " - " migrant (some winter)
Dark-eyed (Oregon) Junco - Uncommon in summer, common in winter
Chipping Sparrow - Uncommon summer visitor

Calliope Hummingbird. Rare migrant
Belted Kingfisher - Regular resident. Few available nesting sites.
Common Flicker - Common resident. Increased numbers in winter
Pileated Woodpecker - Rare vagrant
Acorn Woodpecker - Common resident
Lewis Woodpecker - Uncommon migrant
Yellow-bellied Sapsucker - Common winter visitor.
Hairy Woodpecker - Uncommon vagrant
Downy Woodpecker - Common resident
Nuttall Woodpecker - Common resident
Western Kingbird - Uncommon migrant
Ash-throated Flycatcher - Common summer visitor
Black Phoebe - Common resident
Say Phoebe - Regular winter visitor
Traill Flycatcher - Regular fall migrant
Western Flycatcher - Common summer visitor
Western Wood Pewee - Common summer visitor
Olive-sided Flycatcher - Uncommon summer visitor
Horned Lark - Unusual vagrant
Violet-gr. Swallow. Abundant migrant. Breds commonly. Some winter
Tree Swallow - Common summer visitor. Some winter
Rough-winged Swallow - Common summer visitor
Barn Swallow - " " "
Cliff Swallow - " " "
Purple Martin - Uncommon migrant
Steller Jay - Uncommon fall and winter. Often absent

Glaucous-winged Gull - Uncommon - Winter
Western Gull - Rare - In passage
Herring Gull - Regular near or on route to dump areas. Winter
Calif. " - (same)
Ring-billed Gull - Most common gull in area. Winter
Mew Gull - Winters in small numbers (occasionally many)
Bonaparte Gull - Unusual during migrations and following storms.
Forster Tern } Uncommon migrants
Caspian Tern }
Black Tern - One record
Band-tailed Pigeon - Migrant - Usually few but sometimes large numbers.
Morning Dove - Common resident. Most numerous early fall.
Roadrunner - One record
Barn Owl - Resident in low numbers
Screech Owl - Regular resident
Great Horned Owl - " "
Pygmy Owl - A few scattered records.
Burrowing Owl - Rather rare in isolated spots. Fluctuate.
Long-eared Owl - Rare migrant
Short-eared Owl - In reduced numbers during winter
Saw-whet Owl - Uncommon winter visitor.
Common Nighthawk - One record
Vaux Swift - Migrant
Anna Hummingbird - Common Resident
Rufous Hummingbird - Uncommon spring migrant
Allen Hummingbird - Common summer visitor

White-fronted Goose- Most common goose. Some remain in area during the winter season but area is so narrow that hunting pressures generally push them out.

Snow Goose- Uncommon during migration periods.

Mallard- Common yearround. Main breeding species. Reduced in numbers in proportion to reduction of wetlands in spring & summer.

Gadwall- Unusual. Winter

Pintail- Winter. Most abundant duck at that season. Shallow flooded areas ideal for it.

Green-winged Teal- Fairly common- Winter

Blue-winged Teal- Summer. Rare breeder.

Cinnamon Teal- Fairly common breeder. Most move out in winter season.

American Wigeon (Baldpate)- Fairly commn in winter.

Shoveler- Fair numbers in winter.

Wood Duck- Breeds here where water is available in summer (ponds). In good numbers in winter where willow and ash trees are flooded and provide cover.

Redhead- Occasional individuals. Winter.

R-n Duck- Regular in winter in small numbers. Deeper water areas.

Canvasback- " " ". Sometimes in good numbers. " " "

Greater Scaup } Common. Winter on deeper waters.
Lesser " }

Common Goldeneye- Regular in winter in small numbers. Deeper water

Bufflehead- " " ". Fair numbers. " "

White-winged Scoter- One winter record.

Ruddy Duck- Common. Winter. Persists despite hunting pressure.

Ruby-crowned Kinglet - Common winter visitor
Water Pipit - Common winter visitor
Cedar Waxwing - " " "
Northern Shrike - Rare " "
Loggerhead Shrike - Uncommon resident
Starling - Recent resident - Common - Abundant in winter
Hutton Vireo - Common resident
Solitary Vireo - Common migrant
Warbling Vireo - Uncommon summer visitor
Black and White Warbler - Rare fall migrant
Tennessee Warbler - " " "
Orange-crowned Warbler - Regular summer visitor. Many in fall migration
Nashville Warbler - Uncommon migrant
Parula Warbler - Rare migrant
Yellow Warbler - Common summer visitor
Yellow-rumped Warbler - Common winter visitor (Audubon Warbler, lumped into Myrtle " , one species)
Blk-throated Gray Warbler - Common migrant
Townsend Warbler - Common winter visitor
Hermit Warbler - Uncommon migrant. Occasionally winter.
Chestnut-sided Warbler - Rare migrant
Blackpoll Warbler - " "
Mac Gillivray Warbler - Uncommon migrant
Yellowthroat - Common summer visitor. Reduced in numbers. Habatat loss.
Yellow-breasted Chat - Uncommon summer visitor
Wilson Warbler - Common summer, abundant migrant
House Sparrow - Common resident

White-crowned Sparrow - Abundant winter visitor
Golden-crowned Sparrow - " " "
White-throated Sparrow - Uncommon " "
Fox Sparrow - Abundant " "
Lincoln " - Regular " "
Swamp " - Rare " "
Song " - Common resident

Mammals -

Black-tailed Deer - A few where cover is sufficient
Raccoon - Common - Numbers diminishing.
Striped Skunk - " - " "
Spotted " - " - " "
Gray Fox - Uncommon - " "
Mink - Gone (?) - Formerly regular -
Jack Rabbit - common
Brush rabbit - regular in suitable habitat - not numerous.
Pocket gopher - common above flood levels
mole - common
Wood rat - few
White-footed Mouse - common
Meadow Mouse - "
Brown bat (2 sizes) common in summer
Hoary Bat and Red Bat - uncommon vagrants
Muskrat - common along ditches. Increased since mink are gone.
Gray Squirrel - common where firs are available

Feral house cats !! - Too many!